SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

Main Office

818 West Seventh Street

12th Floor

Los Angeles, California

90017-3435

t (213) 236-1800

f (213) 236-1825

www.scag.ca.gov

MEETING of the

MAGLEV TASK FORCE

Thursday, November 10, 2005
11:00 a.m. – 1:00 p.m.

SCAG Offices
818 W. 7th Street, 12th Floor
Riverside A Conference Room
Los Angeles, California 90017
213. 236.1800

Agenda Enclosed

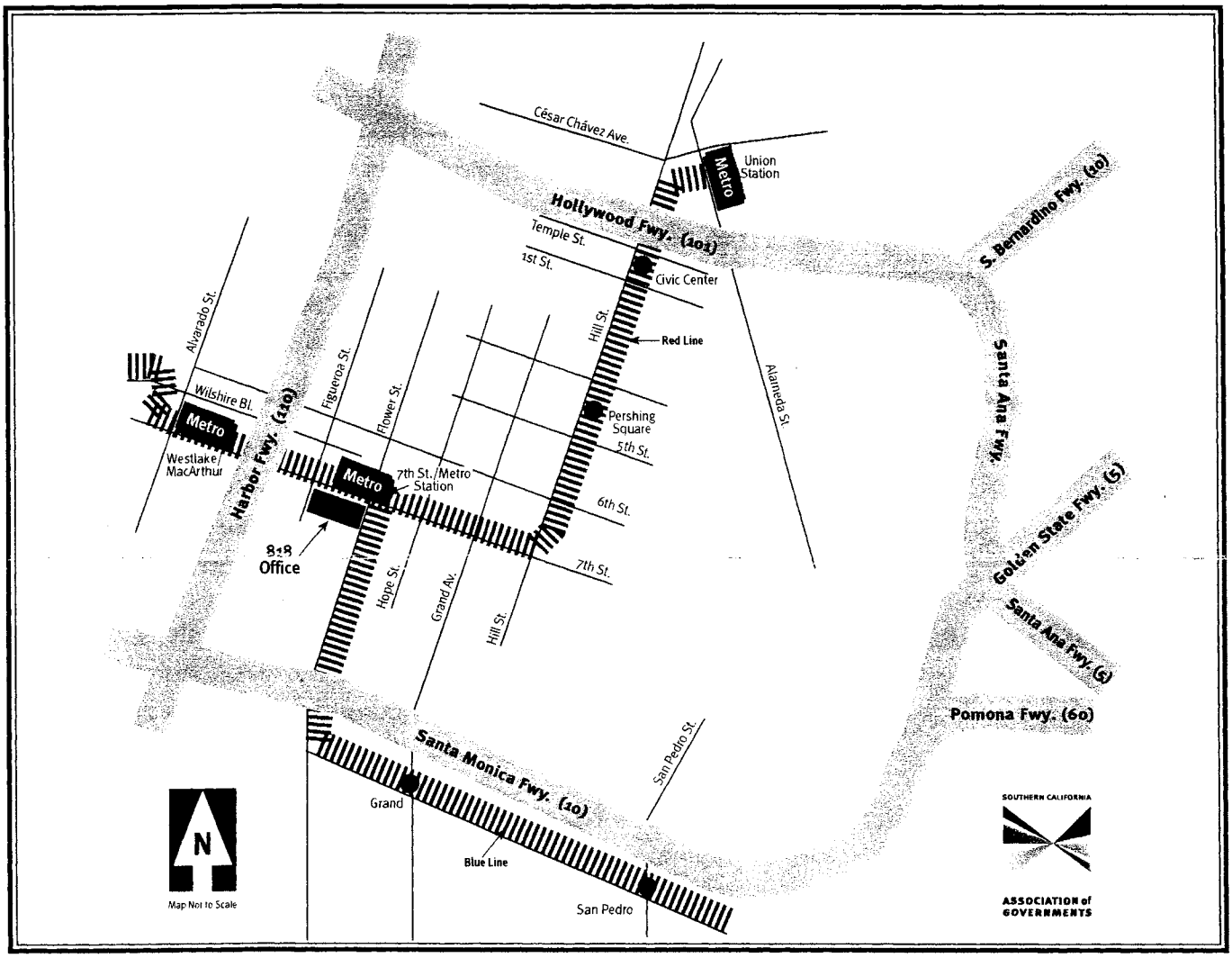
NOTE:
VIDEO CONFERENCE SITE AVAILABLE
(To reserve video conferencing, please contact Arnold San Miguel at 951-784-1513)

SCAG Inland Office
3600 Lime Street, Suite 216
Riverside, CA 92501

If members of the public wish to review the attachments or have any questions on any of the agenda items, please contact Pria Hidisyan at 213.236.1953 or hidisyan@scag.ca.gov.

SCAG, in accordance with the Americans with Disabilities Act (ADA), will accommodate persons who require a modification of accommodation in order to participate in this meeting. If you require such assistance, please contact SCAG at (213) 236-1868 at least 72 hours in advance of the meeting to enable SCAG to make reasonable arrangements. To request documents related to this document in an alternative format, please contact (213) 236-1868.

How to get to the Southern California Association of Governments



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- Harbor Freeway (110) Exit on 6th Street, turn right on Flower.

By Transit...

- SCAG is accessible by all **Metrolink Service** to Union Station. Transfer to the **Metro Red Line** (free transfer with Metrolink ticket) and get off at 7th and Metro **Station. Metro Red Line Service** from Hollywood to SCAG is also available.
- SCAG is accessesible by the **Blue Line.** Get off at 7th and Metro Station.
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SCAG Main Office:
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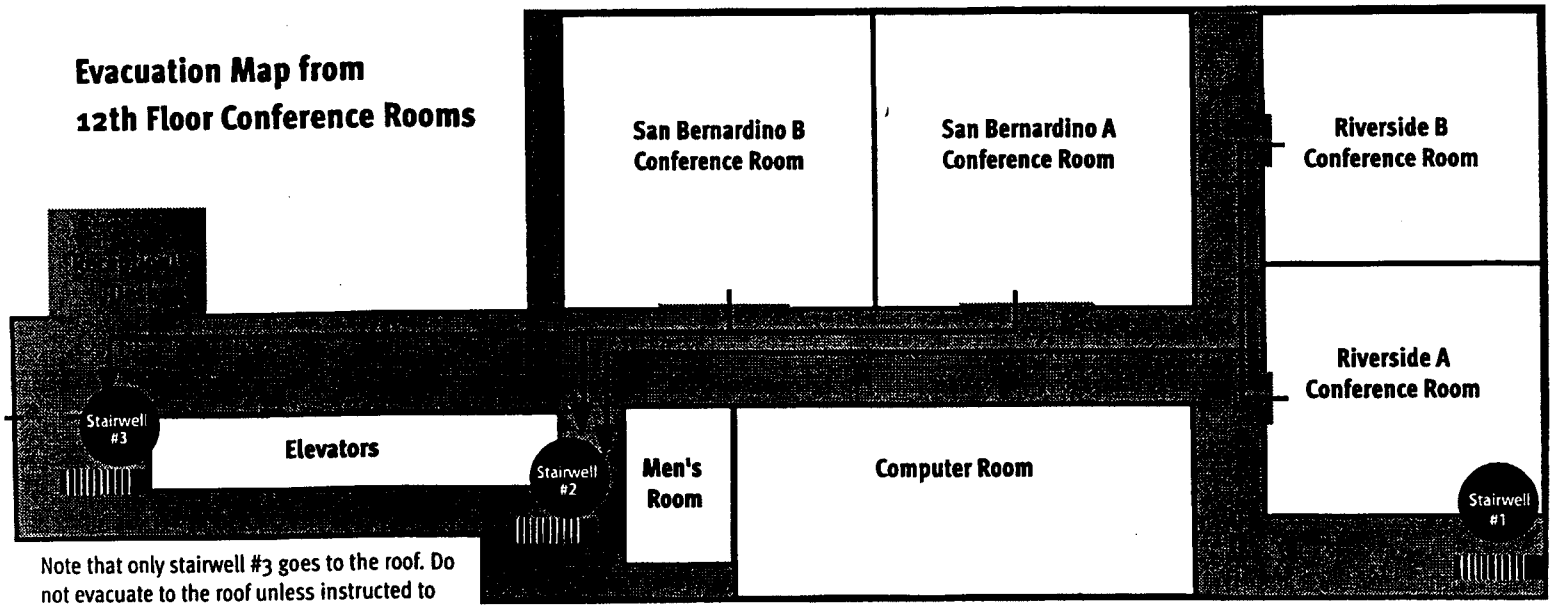
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Rev. 9/99

Emergency Evacuation Procedures:

Evacuation Map from 12th Floor Conference Rooms



Note that only stairwell #3 goes to the roof. Do not evacuate to the roof unless instructed to by Floor Wardens or Fire Department Personnel.

1) SCAG offices will always totally evacuate when an alarm sounds, even if it is thought to be a false alarm.

2) The evacuation stairwells are shown above.

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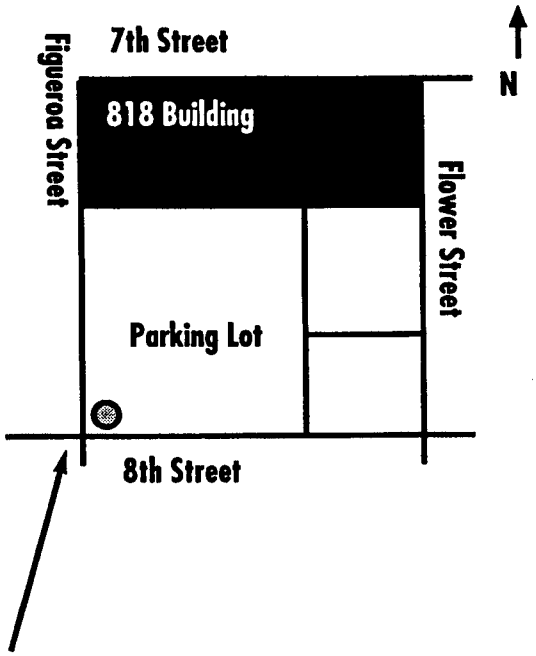
4) SCAG safety officers will be wearing an orange vest during an emergency. Please follow their instructions.



SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

MAGLEV TASK FORCE

AGENDA

PAGE # TIME

1. CALL TO ORDER

2. INTRODUCTIONS AND WELCOME — Hon. Robin Lowe, Chair

3. PUBLIC COMMENT PERIOD

   Members of the public wishing to speak on an agenda item or not on the agenda, but within the purview of this committee, must notify the Staff and fill out a speaker's card prior to speaking. Comments will be limited to three minutes. The Chair may limit the total time for comments to 20 minutes.

4. CONSENT CALENDAR

   4.1. Summary Minutes of the September 8, 2005 Task Force meeting.

5. ACTION ITEMS

   5.1. Approval of Public Involvement Plan (attachment) — Chris Robert, President, The Robert Group

   Recommended Action:
   Approve Public Involvement Plan presented by the Robert Group as part of the Phase 2 Outreach and Communications effort.

   5.2. Approval of Cost Estimation Methodology (attachment) — Don Currie, Senior Associate, IBI Group

   Recommended Action:
   Approve the Cost Estimation Methodology presented by IBI Group for Phase 2.

6. INFORMATION ITEMS

   6.1. Update on Maglev Orange Line — Al Perdon, Executive Director, Orange Line Joint Power Authority

6.2. Cambridge Systematics Alternatives Analysis Update	**Zahi Faranesh, SCAG Program Manager**
6.3. Shanghai Trip Update	**Zahi Faranesh, SCAG Program Manager**

7. OPEN DISCUSSION — **Committee Members**

Provide direction to staff on issues of interest for future discussion.

8. CHAIR'S REPORT — **Hon. Robin Lowe, Chair**

9. NEXT MEETING
December 8, 2005

Summary Minutes
MAGLEV TASK FORCE MEETING
Thursday, September 8, 2005

The Maglev Task Force of the Southern California Association of Governments held its meeting at the SCAG offices downtown Los Angeles. The meeting was called to order by the Vice Chair Lou Bone, City of Tustin. There was a quorum.

1.0 CALL TO ORDER

Vice Chairman Lou Bone called the meeting to order.

2.0 INTRODUCTION

Vice Chairman Lou Bone conducted introductions and welcome of members and audience present at SCAG's Los Angeles and Riverside offices.

3.0 PUBLIC COMMENT PERIOD

Don Kornreich stated that he has done research on Maglev. His analyses indicate that using Maglev for goods movement provides a superior return on investment to passenger movement. While he stated that both are important, he believes that the Task Force has not paid enough attention to the potentials of Maglev for goods movement.

4.0 CONSENT CALENDAR

4.1 Minutes from the meeting of June 7, 2005 were approved.

5.0 ACTION ITEMS

No action Items

6.0 INFORMATION ITEMS

6.1 Shanghai Trip Update

Mr. Zahi Faranesh gave an update on the plans to organize a trip to Shanghai, and possibly Japan, to experience Maglev. There is a possibility that the SCAG delegation might join the SANDAG delegation. The trip has been pushed back to January or February of 2006. Given that using general fund monies was rejected by the Regional Council, staff is contacting and exploring various governmental and local funding sources. Also, the trip's scope may be expanded to include goods movement and other topic areas.

Mr. Lou Bone clarified that there are potential conflicts of interest for electeds to receive funding from outside sources to go on the trip. However, if the funding comes from China or from private entities that give money to SCAG, who would

choose the delegation, there will be no problems for the elected officials. Mr. Bone emphasized that members from Los Angeles, San Bernardino and Ontario should go on the trip.

Mr. Greig Smith mentioned that LA Airport might send Los Angeles and Ontario in February or March, 2006. He suggested coordinating the timing of these two trips so as to lessen the burden on SCAG.

Mr. Ron Bates added that as many as possible of the key decision-makers on the IOS corridor be included on the trip.

6.2 Lockheed/Phase II introduction and kickoff presentation on Preliminary Engineering

Mr. Zahi Faranesh provided background, stating that Phase I was completed with the selection of the IOS, from West LA to Ontario, and Phase II has now begun for preliminary engineering.

Mr. Ralph Tourino of Lockheed Martin, introduced IBI Group as their partner in preliminary engineering. Mr. David Chow gave an overview of the team structure and provided background on the three phases. Arellano Associates and the Robert Group are partners in the outreach efforts. JL Patterson Associates and Aztec Engineering will also assist in engineering work.

Mr. Ron Bates asked Mr. Chow to reflect on Mr. Kornreich's comments on the goods movement potential of the system for greater return on investment. Mr. Chow responded that current revenue estimates are conservative relative to the goods movement issue. To date, goods movement has been discussed in terms of time-sensitive, high-value packaging, not container cargo because of its different set of requirements for levitation. Transrapid International has begun looking at moving cargo and confirms that the system could have that capability with the appropriate upgrades.

Mr. Gene Daniels emphasized that the outreach program should be bottom-up, instead of top-down. Mr. Chow agreed that this is an important strategy that will be taken as the program develops beyond the conceptual stage.

Mr. Chow outlined IOS route, as well as the 3 alignment options east of Union Station. Mr. Lou Bone inquired as to the current headway of the system and the potential for skip-stops. Mr. Chow responded that the current headway is 10 minutes, making skip-stops a manageable possibility.

Mr. Bates asked about the inclusion of LAX in the system. Mr. Chow confirmed that the best performing scenarios from a revenue perspective included LAX. Mr. Bates stated that not including LAX may make it very difficult to finance the system. Also, the political opposition was resolved upon establishing that the system would be built from east to west to mitigate congesting LAX. Ms. Sarah

Adams added that the Alternatives Analysis will study a link to LAX, but at this point, the focus is on the IOS. It was also confirmed that LAX has signed an MOU and will begin participating in this process. Mr. Zahi Faranesh added that ridership will be enhanced given Maglev's speed. The system in Shanghai travels as much as 280 miles per hour.

Mr. Chow outlined the milestone deliverables, including a study on transit oriented development around stations, station design, developing refined cost estimates and outreach and communication.

Mr. Lou Bone emphasized that there must be consideration of the long-term capacity need for parking at the stations. Mr. Chow affirmed that the vision for the stations would be much more than is the case for light rail stations. They would serve more as "Magports", accommodating 5,000 to 10,000 cars.

Mr. Chow outlined the 12-month schedule. The first deliverable, the public involvement plan, is already prepared. The second deliverable is the cost estimating approach, which will be ready in October 2005. The third is the transit oriented development potential in February 2006. And the engineering work, plans and profiles for alignment, station design and the maintenance facility will be presented in August 2006.

Mr. Bates asked about the progress of a San Gabriel Valley station. Mr. Chow stated that previous work identified options for station locations, but discussions will need to be recommenced with cities in the San Gabriel Valley to update these potentials.

Ms. Chris Robert spoke of the public participation program. An assessment of key stakeholder municipalities, and the timing in which to approach them is being conducted. The kickoff is to be immediate; presentations will be made to municipalities to provide an overview of the program. Discussions on station siting will follow in February/March 2006. Finally, project recommendations will be given in June 2006. These strategies will focus on presenting the benefits to cities. A website will also be created to provide information on the project and Maglev in general. Fact sheets will also be produced and distributed throughout the process.

Mr. Faranesh added that SCAG staff is reviewing the Public Involvement Plan. It will be finalized and ready for approval by the next Task Force meeting.

Mr. Anthony Piunno asked for clarification on the dates given in the presentation. Mr. Chow confirmed that the dates are not contractual dates, but rather presentation dates to the task force.

Mr. Alan Wapner expressed concern that Lockheed Martin has not met with local staff engineers, and that the Arrellano Group has not met with the city. Mr. Chow assured Mr. Wapner that this will be part of the process. Given that their contract began September 1, 2005, they have yet to reach that point.

Mr. Bates asked whether a final preferred route, with options or alternatives, would be recommended during the August 2006 presentation. Mr. Chow confirmed that there would.

Mr. Lou Bone asked whether a DVD would be available for each municipality to use with a personalized voiceover, showing the Maglev technology and discussing the project. Ms. Adams stated that this could be made available. Mr. Chow added that more copies of the video that Lockheed Martin has made could also be distributed.

6.3 Cambridge Systematics Alternatives Analysis Update

Mr. Zahi Faranesh updated on the alternatives analysis, comparing Maglev and the state high speed rail on the IOS. Analyzing these alternatives was a condition of receiving FRA grants for preliminary engineering. An MOU was developed between the City of Los Angeles, SANBAG, City of Ontario and SCAG. The FRA has requested a detailed workplan from Cambridge as the consultant on the analysis. The workplan is estimated to be complete in two to three weeks. When this is complete, a presentation on the workplan may be made to the task force. Mr. Ron Bates asked whether the state high-speed rail plan was feasible at this time. Mr. Faranesh responded that the state system will include a bond presented in 2010.

Ms. Adams added that the EIR for the state system has been completed. It is a proposed system similar to Maglev. Mr. Bates asked Ms. Adams to describe the route of the proposed state system. Ms. Adams stated that the system would run a similar route from Union Station to Ontario airport, using the Metrolink alignment which would be upgraded to include high-speed technologies. Mr. Chow added that unless grade separations are done, as will be with Maglev, it will be difficult for this proposed system to achieve high speeds. The analysis will be completed within nine months from the NTP after the detailed work plan is complete.

6.4 Federal SAFETEA-LU Update

Ms. Sarah Adams presented an update on the recently passed SAFETEA-LU. $1.4 billion was earmarked within the SCAG region, out of $24.2 billion given nationally. Major earmarks included Eastside light rail which received 400 million, Alameda Corridor east received between $178 to 187 million, I-405 HOV lanes received $130 million, Desmond Bridge was funded at $100 million.

Maglev was funded at $90 million over a 5 year period, divided in half between Las Vegas to Prim line and an unknown project east of the Mississippi. A number of new provisions were also made, including an increase in funding to MPOs, and the extension of RTP cycles to 4 years from 3 years. Ms. Adams mentioned a note in the bill that states that a Southern California regional high-speed transit system will be given authority for preliminary engineering funding. It is unclear whether this is

in reference to SCAG. Recent discussion has also indicated that the FTA may become involved in the federal Maglev program through its New Starts program.

Ms. Adams added that the Orange line received $280,000 under the high priorities program for feasibility studies. A presentation by the Orange line may be made next month. Also, $800,000 was given to Bob Filner's district to do a feasibility study from San Diego airport to Imperial County.

6.5 Update on Anaheim to Las Vegas Project

Tom Wall gave background on the Programmatic EIS process for California/Las Vegas. The lead Federal agency is the Federal Railroad Administration and the lead State agency is the Nevada Department of Transportation. Caltrans and the California/Nevada Super Speed Train Commission are cooperating agencies. Also, American Magline Group (AMG) is a private partner to the commission. URS is the environmental consultant on the project.

Phase I was completed in 2004. A Notice of Intent was issued, Public Scoping meetings were held and a Tentative Scope of Work for Phase II was written, which is the documentation required to get a Record of Decision. At this point, this only involves the NEPA process, not the CEQA process, through a two tiered process. The first component is at the programmatic level for the entire 269 mile length of the system from Las Vegas to Anaheim, and the second is at the project level of the Primm to Las Vegas portion. The Scope of Work is being drafted and will be submitted to Nevada DOT this month. The contract is expected to begin in November. It is anticipated that receiving Records of Decision on these two components (the program and project level EIS's) will be a 2-year process.

Mr. Bates asked if more detailed cost estimates would become clear through the EIS process. Mr. Wall responded that their focus would be on the environmental impact process. The Nevada Super Speed Train Commission and AMG would deal more with other issues.

Mr. Bates stated that it is important to look at how this system will affect the traffic concerns in our region. He suggested that considering a stop in Corona may help alleviate some of the traffic congestion and environmental concerns along highway 91. Mr. Wall recommended that those types of comments should be forwarded from jurisdictions directly to Jim Mallory at NDOT. He added that many similar comments were collected during Phase I and incorporated into the final report.

Mr. Bone added that in recent meetings with OCTA regarding highways 91, 55, 57, 5, and 22, there was no mention of Maglev along the 91 corridor. Mr. Wall suggested that these questions be sent directly to NDOT given that they are determining the parameters of the analysis. Mr. Bates proposed that the Task Force send a letter to NDOT expressing concern that this option of adding a stop in the Corona area is not being considered. Ms. Adams stated that a letter was sent during

the scoping process, along with comments regarding the addition of a Corona station. She said that a follow-up letter could be sent to NDOT, if desired.

Mr. Alan Wapner stated that he serves on the California Nevada Super Speed Train Commission. He received a letter from the Mayor and City Council of Corona stating that they were irate that a stop was being discussed, since they had never talked about the possibility of a stop, nor do they want a stop. Lou Bone said that his discussions with Council members at conferences and elsewhere have indicated otherwise. Mr. Wapner explained that there may have been informal discussions, but their Council has never discussed it. Mr. Wall stated that since they have not yet finalized the contract, they will continue to get direction from NDOT on whom they should discuss this issue with.

Mr. Robert Hernandez asked whether there had been any consideration or dialogue regarding the benefits that Corona would receive by locating a station in their community. He offered to engage in this discussion with his contacts on the City Council in Corona. Mr. Christine Barnes asked if Corona has seen any of the videos or promotional materials on Maglev. Ms. Adams responded that their consultants were given materials and presentations on Maglev.

Mr. Wapner questioned why the Task Force is concerning itself with a project that is being managed and funded by a different agency. He stated that the impetus for this line was to provide an efficient way to get to Ontario Airport, but the more stops there are along the way, the less incentive to take Maglev there. Mr. Bone responded that we have an MOU with CalNevada, and should therefore stay abreast of the project. Mr. Bates added that it is also important to consider the bottom-line financial scenario, and there may be economic benefits to the area.

7.0 OPEN DISCUSSION

Sarah Adams introduced Pria Hidisyan as the new project manager for Maglev and the contact person for the task force.

Mr. Wapner asked that the next meeting be rescheduled given that it is on October 13 which is Yom Kippur. With additional scheduling conflicts, the meeting was cancelled. The next meeting will be November 10, 2005.

8.0 CHAIR'S REPORT

No Chair's Report.

9.0 NEXT MEETING

November 10, 2005

ATTENDANCE LIST
(FROM SIGN-IN SHEETS)

Members Present:

Hon. Lou Bone, Vice Chair	City of Tustin
Hon. Gene Daniels	City of Paramount
*Hon. Alan Wapner	City of Ontario
Hon. Greig Smith	City of Los Angeles
Hon. Frank Gurule	City of Cudahy
Mr. James McCarthy	Caltrans District 7
Hon. Christine Barnes	City of La Palma
Hon. Robert Hernandez	City of Anaheim
Dr. Ron Bates	Resident of Los Alamitos

(*Attended via videoconference)

Guests:

Sharad Mulchand	MTA
Bart Reed	Transit Coalition
David Akers	CNCPC
David Chow	IBI Group
Gary Green	Caltrans District 8
Don Kornreich	Resident of Laguna Woods
Laura Muna-Landa	Arellano Associates
Chris Robert	The Robert Group
Rick Deming	Caltrans Rail
Tom Wall	URS
*Tom Danna	City of Ontario
*Wendy Villa	City of Riverside

(*Attended via videoconference)

SCAG Staff:

Sarah Adams
Naresh Amatya
Zahi Faranesh
Pria Hidisyan
Rich Macias
Anthony Piunno

MEMO ITEM 5.1

To: **Maglev Task Force Members**

From: **Zahi Faranesh (x819) and Pria Hidisyan (x953)**

Date: **November 10, 2005**

RE: **Public Involvement Plan**

RECOMMENDATION:

Review and approve the attached Public Involvement Plan presented by the Robert Group as part of the Phase 2 (Preliminary Engineering) Outreach and Communications effort. The plan is a strategic, comprehensive and systematic approach for interfacing with key stakeholders.

SUMMARY:

Staff reviewed and provided feedback to the Public Involvement Plan. The plan was found to be consistent with the Outreach/Communications component of the Scope of Work identified for Phase 2, specifically Milestone 5 of Part 1, and Milestone 4 of Parts 2 and 3. The plan is also consistent with Federal Railroad Administration requirements.

The document discusses the following:

1. Stakeholder Identification
2. Stakeholder Meetings
3. Station Siting Workshop
4. Collateral Material Development
5. Website
6. Summary of Comments

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

MAGLEV DEPLOYMENT PROGRAM

PART 1 - MILESTONE 5
PART 2 - MILESTONE 4
PART 3 - MILESTONE 4

PUBLIC INVOLVEMENT PLAN

September 2005

Lockheed Martin- Integrated Systems and Solutions
2050 S. Blosser Road
Santa Maria, CA 93458

IBI Group
18401 Von Karman Avenue, Suite 110
Irvine, CA 92612

MAGLEV
TURNING THE VISION INTO REALITY

Table of Contents

2.0 Executive Summary

Overview

This document presents the three Public Involvement Plans (PIP) completed as part of the Maglev Deployment Program: Phase 2 Outreach and Communications effort. The PIP reports will address each of the three project parts, from West Los Angeles to Ontario International Airport, approximately 54 miles in length. The project parts are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley (19 miles)
- Part II: San Gabriel Valley to Union Station (18 miles)
- Part III: Union Station to West Los Angeles (17 miles)

The PIP reports are identified as deliverables under the following project Milestones:

- Part I: Ontario International Airport to San Gabriel Valley – Milestone 5
- Part II: San Gabriel Valley to Union Station – Milestone 4
- Part III: Union Station to West Los Angeles – Milestone 4

These reports document the strategic, comprehensive and systematic approach that the Project Team will employ to interface with key stakeholders. The approach will include:

- Identifying key elected officials, policy-makers and influential stakeholders to be briefed;
- Focusing the outreach for this phase on potential Maglev station locations;
- Scheduling presentations at three milestones during the project;
    - Kick-off (September 2005)
    - Station Siting (February/March 2006)
    - Project Recommendations (June 2006)
- Organizing station siting workshops for potential locations to be conducted with City, County and agency staff, prior to the February/March 2006 briefings;
- Developing clear and thematic presentations, tailored for individual audiences and provided on an ongoing basis to appropriate individuals and organizations;

- Providing the webmaster with timely information during the term of the study to post on a Maglev Phase 2 site located on SCAG's website; and,

- Developing at least three Fact Sheets, corresponding with the project milestones (i.e. project initiation, station alternatives and project alignment/recommendations) for distribution and posting to the website.

- Coordination with related major transportation projects located along the proposed Maglev alignment including the California/Nevada Maglev Project, the Ontario Airport Master Plan, the Alameda Corridor East (ACE) Project, and the West Los Angeles Transit Hub Study.

Stakeholder Identification

Key stakeholders within each project segment have been targeted for the Outreach and Communications effort. Utilizing a tiered approach, agency representatives, civic leaders, elected officials and key staffers from every level of government including municipal, state and federal offices within these geographic segments are identified and briefings recommended. Additional stakeholders such as developers and other economic interests will also be provided detailed presentations. Elected officials identified include both those with portions of proposed alignments in their districts, and representatives with key committee or leadership assignments. Municipal and civic stakeholders are identified in their capacities as either key policy makers or leaders of active organizations or those organizations themselves, with a focus on business and economic development, transportation and land use advocacy. In all briefings, comments and concerns will be noted, analyzed and addressed. Where parts of the study overlap, one tailored presentation will be made to that stakeholder, rather than conducting multiple meetings.

Stakeholder Meetings

Meetings for Maglev Phase 2 will focus on stakeholders at potential station sites along the alignment. Thus, it will be especially important to brief those stakeholders representing the cities of Los Angeles, West Covina, Industry (an alternative to the West Covina station site) and Ontario, though stakeholders representing jurisdictions along that alignment will also be identified.

Meetings with these key stakeholders will take place at key project milestones, respectively at the project kicks-off (September 2005), as the locations of the potential stations are identified (February/March 2006) and then as the project recommendations are finalized (June 2006). The team will prepare PowerPoint presentations tailored to each geographic segment, although common themes will also be addressed.

Station Siting Workshop

Station Siting Workshops are proposed for the Maglev Phase 2 project and will involve agency and City representatives from the cities of West Covina or Industry, Los Angeles and Ontario. This workshop will aid the project team in refining its decision-making related to station siting prior to the second round of stakeholder briefings in February/March 2006.

Collateral Material Development

As noted, a PowerPoint presentation will be developed for each round of briefings which will also be used as a "leave behind" after each meeting. In addition, at least three fact sheets will be developed and distributed around the three major critical milestones, and copies of the PowerPoint presentations were provided as "leave behind" materials at all briefings.

Website

Maglev Phase 2 materials, such as the project Fact Sheets and PowerPoint presentations, will be provided by the Lockheed Martin Team to the webmaster for posting on a dedicated page located at SCAG's website. This page will be updated, at minimum, at each project milestone. Information on the website will include PDF versions of approved Fact Sheets, clear graphic presentation of possible station sites, and the most current PowerPoint presentation. This page will be an especially useful tool in directing stakeholders to one central accessible source of project information. In addition, the website will permit users to submit questions to SCAG about the project.

Summary of Comments

Comments collected during the course of the Maglev Phase 2 project will be summarized and prepared in the narrative and categorized. These comments should reflect the general sentiment of key stakeholders and provide a broader context for the project recommendations. Comments and questions will be answered jointly by the consultant and SCAG's Project Manager.

2.5.1 Public Involvement Plan – Part 1

Overview

This Milestone Report, Outreach and Communications for the Maglev Deployment Program: Phase 2 Part I, is the first of three focused documents that will address consensus-building along the geographic segments of this project. This report will address Part I, Ontario International Airport (ONT) to the San Gabriel Valley. Part I is approximately 19 miles in length and contains 2 stations. The remaining parts are as follows:

- Part II: San Gabriel Valley to Union Station
- Part III: Union Station to West Los Angeles

This report documents the strategic, comprehensive and systematic approach that the Project Team will employ to interface with key stakeholders. This will include:

- Identifying key elected officials, policy-makers and influential stakeholders to be briefed;
- Focusing the outreach for this phase on two potential Maglev station locations;
    - City of West Covina and/or the City of Industry
    - City of Ontario/Ontario International Airport (LAWA)
- Scheduling presentations at three milestones during the project;
    - Kick-off (September 2005)
    - Station Siting (February/March 2006)
    - Project Recommendations (June 2006)
- Organizing station siting workshops for potential West Covina/Industry and Ontario locations to be conducted with City, County and agency staff prior to the February/March 2006 briefings.;
- Developing clear and thematic presentations, tailored for individual audiences and provided on an ongoing basis to appropriate individuals and organizations;
- Providing the webmaster with timely information during the term of the study to post on a Maglev Phase 2 site located on SCAG's website; and,

- Developing at least three Fact Sheets, corresponding with the project milestones (i.e. project initiation, station alternatives and project alignment/recommendations) for distribution and posting to the website.

- Coordination with related major transportation projects located along this segment of the proposed Maglev alignment including the California/Nevada Maglev Project and the Ontario Airport Master Plan.

Stakeholder Identification

This section provides an overview of key stakeholders targeted for the Outreach and Communications effort. Utilizing a tiered approach, agency representatives, civic leaders, elected officials and key staffers from every level of government including municipal, state and federal offices within these geographic segments are identified and briefings recommended. Additional stakeholders such as developers and other economic interests will also be provided detailed presentations. Elected officials identified include both those with portions of proposed alignments in their districts, and representatives with key committee or leadership assignments. Municipal and civic stakeholders are identified in their capacities as either key policy makers or leaders of active organizations or those organizations themselves, with a focus on business and economic development, transportation and land use advocacy. In all briefings, comments and concerns will be noted, analyzed and addressed.

Stakeholders identified include, at minimum, the following:

Elected Officials

- Federal Elected Officials
    - U.S. Senator Dianne Feinstein
    - U.S. Senator Barbara Boxer
    - Congressman Gary Miller (Committee/Transportation & Infrastructure)
    - Congressman Joe Baca
    - Congresswoman Hilda Solis
    - Congresswoman Grace Napolitano
- State of California
    - California State Senator Tom Torlakson (Chair, Transportation Committee)
    - California State Senator Nell Soto
    - California State Senator Gloria Romero

  - Assemblywoman Jenny Oropeza (Chair, Transportation Committee)
  - Assemblywoman Gloria Negrete McLeod
  - Assemblyman Ed Chavez
- Los Angeles County Supervisors
  - Mike Antonovich
- San Bernardino County Supervisors
  - Gary Ovitt
- Other Government
  - San Bernardino Associated Governments (SANBAG)
  - Riverside County Transportation Commission (RCTC)

Interagency Coordination

- Los Angeles World Airports (LAWA)
- City of Ontario
- City of Industry
- City of West Covina
- Caltrans Districts 7 & 8
- Federal Transit Administration (FTA)
- Federal Railroad Administration (FRA)

Business/Transportation Advocacy Groups

- Inland Empire
  - Inland Empire Economic Partnership
  - United Parcel Service (UPS)
  - Housing Developers
  - Union Pacific Railway (UP)
  - Burlington Northern Santa Fe Railway (BNSF)

Where parts of the study overlap, one tailored presentation will be made to that stakeholder, rather than multiple meetings.

Stakeholder Meetings

Meetings for Maglev Phase 2, Part I will focus on stakeholders at potential station sites in the ONT to West Covina segment. Thus, it will be especially important to brief those stakeholders representing the cities of Ontario, West Covina and Industry (an alternative to the West Covina station site) as well as LAWA, though stakeholders representing jurisdictions along that alignment have also been identified.

Meeting with these key stakeholders will take place at key project milestones, respectively at the project kicks-off (September 2005), as the locations of the potential stations are identified (February/March 2006) and then as the project recommendations are finalized (June 2006). The team will prepare PowerPoint presentations tailored to each geographic segment, although common themes will also be addressed.

Station Siting Workshop

Station Siting Workshops are proposed for Maglev Phase 2, Part I and will involve agency and City representatives from the City of Ontario, LAWA, and the cities of West Covina or Industry. This workshop will aid the project team in refining its decision-making related to station siting prior to the second round of stakeholder briefings in February/March 2006.

Collateral Material Development

As noted, a PowerPoint presentation will be developed for each round of briefings which will also be used as a "leave behind" after each meeting. In addition, at least three fact sheets will be developed and distributed around the three major critical milestones, and copies of the PowerPoint presentations were provided as "leave behind" materials at all briefings.

Website

Maglev Phase 2 materials, such as the project Fact Sheets and PowerPoint presentations, will be provided by the Lockheed Martin Team to the webmaster for posting on a dedicated page located at SCAG's website. This page will be updated, at minimum, at each project milestone. Information on the website will include PDF versions of approved Fact Sheets, clear graphic presentation of possible station sites, and the most current PowerPoint presentation. This page will be an especially useful tool in directing stakeholders to one central accessible source of project information. In addition, the website will permit users to submit questions to SCAG about the project.

Summary of Comments

Comments collected during the course of Maglev Phase 2 Part I will be summarized and prepared in the narrative and categorized. These comments should reflect the general sentiment of key stakeholders and provide a broader context for the project

recommendations. Comments and questions will be answered jointly by the consultant and SCAG's Project Manager.

2.4.2 Public Involvement Plan – Part 2

Overview

This Milestone Report, Outreach and Communications for the Maglev Deployment Program: Phase 2 Part II, is the second of three focused documents that will address consensus-building along the geographic segments of this project. This report will address Part II, San Gabriel Valley to Union Station. Part II is approximately 18 miles in length with one station. The remaining segments are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley
- Part III: Union Station to West Los Angeles

This report documents the strategic, comprehensive and systematic approach that the Project Team will employ to interface with key stakeholders. This will include:

- Identifying key elected officials, policy-makers and influential stakeholders to be briefed;
- Focusing the outreach for this phase on two potential Maglev station locations;
    - City of West Covina and/or the City of Industry
    - City of Los Angeles (Downtown only)
- Scheduling presentations at three milestones during the project;
    - Kick-off (September 2005)
    - Station Siting (February/March 2006)
    - Project Recommendations (June 2006)
- Organizing station siting workshops for potential West Covina/Industry and City of Los Angeles (Union Station) locations to be conducted with City, County and agency staff, prior to the February/March 2006 briefings;
- Developing clear and thematic presentations, tailored for individual audiences and provided on an ongoing basis to appropriate individuals and organizations;
- Providing the webmaster with timely information to post on a Maglev Phase 2 site located on SCAG's website; and,
- Developing at least three Fact Sheets, corresponding with the project milestones (i.e. background/project description, station alternatives and project recommendations) for distribution and posting to the website.

- Coordination with related major transportation projects located along this segment of the proposed Maglev alignment including the Alameda Corridor East (ACE) Project.

Stakeholder Identification

This section provides an overview of key stakeholders targeted for the Outreach and Communications effort. Utilizing a tiered approach, agency representatives, civic leaders, elected officials and key staffers from every level of government including municipal, state and federal offices within these geographic segments are identified and briefings recommended. Additional stakeholders such as developers and other economic interests will also be provided detailed presentations. Elected officials identified include both those with portions of proposed alignments in their districts, and representatives with key committee or leadership assignments. Municipal and civic stakeholders are identified in their capacities as either key policy makers or leaders of active organizations or those organizations themselves, with a focus on business and economic development, transportation and land use advocacy. In all briefings, comments and concerns will be noted, analyzed and addressed.

Stakeholders identified include, at minimum, the following:

Elected Officials

- Federal Elected Officials
    - U.S. Senator Dianne Feinstein
    - U.S. Senator Barbara Boxer
    - Congressman Gary Miller (Committee/Transportation & Infrastructure)
    - Congresswoman Hilda Solis
    - Congressman Adam Schiff
    - Congresswoman Lucille Roybal-Allard
- State of California
    - California State Senator Tom Torlakson (Chair, Transportation Committee)
    - California State Senator Gloria Romero
    - California State Senator Jack Scott
    - California State Senator Gil Cedillo
    - Assemblywoman Jenny Oropeza (Chair, Transportation Committee)

  - Assemblyman Ed Chavez
  - Assemblywoman Judy Chu
  - Assemblyman and Speaker Fabian Nuñez
- Los Angeles County Supervisors
  - Gloria Molina
- City of Los Angeles
  - Office of Mayor Antonio Villaraigosa
- Los Angeles City Councilmembers
  - Ed Reyes
  - Jan Perry
  - Council District 14 (vacant)
  - Wendy Greuel (Chair, Transportation Committee)
  - Greig Smith (Member, Transportation Committee)
- Other Government
  - San Gabriel Valley COG

Business/Transportation Advocacy Groups

- Los Angeles Area
  - Los Angeles Area Chamber of Commerce
  - Central City Association
  - Central City Association East
  - Transit Coalition
  - Union Pacific Railway (UP)
  - Burlington Northern Santa Fe Railway (BNSF)
- Other
  - Gabriel Valley Economic Alliance

Interagency Coordination

- Los Angeles County Metropolitan Transportation Authority (Metro)
- Los Angeles Department of Transportation (LADOT)
- Los Angeles City Planning
- Amtrak
- Metrolink
- Caltrans Districts 7
- Federal Transit Administration (FTA)
- Federal Railroad Administration (FRA)

Institutions

- Union Station
- ProLogis (parent company of Catellus, Union Station property owner)

Where segments of the study overlap, one tailored presentation will be made to that stakeholder, rather than multiple meetings.

Stakeholder Meetings

Meetings for Maglev Phase 2, Part II will focus on stakeholders at potential station sites in Part II, West Covina to Union Station segment. Thus, it will be especially important to brief those stakeholders representing the cities of West Covina and Industry (an alternative to the West Covina station site) and the City of Los Angeles (Downtown area), though stakeholders representing jurisdictions along that alignment have also been identified.

Meeting with these key stakeholders will take place at key project milestones, respectively at the project kicks-off (September 2005), as the locations of the potential stations are identified (February/March 2006) and then as the project recommendations are finalized (June 2006). The team will prepare PowerPoint presentations tailored to each geographic segment, although common themes will also be addressed.

Station Siting Workshop

Station Siting Workshops are proposed for Maglev Phase 2, Part II and will involve agency and City representatives from the cities of West Covina or Industry and the City of Los Angeles, focusing on the Downtown area. This workshop will aid the project team in refining its decision-making related to station siting prior to the second round of stakeholder briefings in February/March 2006.

Collateral Material Development

As noted, a PowerPoint presentation will be developed for each round of briefings which will also be used as a "leave behind" after each meeting. In addition, at least three fact sheets will be developed and distributed around the three major critical milestones, and copies of the PowerPoint presentations were provided as "leave behind" materials at all briefings.

Website

Maglev Phase 2 materials, such as the project Fact Sheets and PowerPoint presentations, will be provided by the Lockheed Martin Team to the webmaster for posting on a dedicated page located at SCAG's website. This page will be updated, at minimum, at each project milestone. Information on the website will include PDF versions of approved Fact Sheets, clear graphic presentation of possible station sites, and the most current PowerPoint presentation. This page will be an especially useful tool in directing stakeholders to one central accessible source of project information. In addition, the website will permit users to submit questions to SCAG about the project.

Summary of Comments

Comments collected during the course of Maglev Phase 2 Part II will be summarized and prepared in the narrative and categorized. These comments should reflect the general sentiment of key stakeholders and provide a broader context for the project recommendations. Comments and questions will be answered jointly by the consultant and SCAG's Project Manager.

2.4.3 Public Involvement Plan – Part 3

Overview

This Milestone Report, Outreach and Communications for the Maglev Deployment Program: Phase 2 Part III, is the third of three focused documents that will address consensus-building along the geographic segments of this project. This report will address Part III: Union Station to West Los Angeles. Part III is approximately 17 miles with one station. The remaining segments are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley
- Part II: San Gabriel Valley to Union Station

This report documents the strategic, comprehensive and systematic approach that the Project Team will employ to interface with key stakeholders. This will include:

- Identifying key elected officials, policy-makers and influential stakeholders to be briefed;
- Focusing the outreach for this phase on two potential Maglev station locations;
    - City of Los Angeles (Downtown)
    - City of Los Angeles (Westside)
- Scheduling presentations at three milestones during the project;
    - Kick-off (September 2005)
    - Station Siting (February/March 2006)
    - Project Recommendations (June 2006)
- Organizing station siting workshops for potential City of Los Angeles (Union Station and Westside) locations to be conducted with City, County and agency staff prior to the February/March 2006 briefings;
- Developing clear and thematic presentations, tailored for individual audiences and provided on an ongoing basis to appropriate individuals and organizations;
- Providing the webmaster with timely information during the term of study to post on a Maglev Phase 2 site located on SCAG's website; and,
- Developing at least three Fact Sheets, corresponding with the project milestones (i.e. project initiation, station alternatives and project alignment/recommendations) for distribution and posting to the website.

- Coordination with related major transportation projects located along this segment of the proposed Maglev alignment including the West Los Angeles Transit Hub Study.

Stakeholder Identification

This section provides an overview of key stakeholders targeted for the Outreach and Communications effort. Utilizing a tiered approach, agency representatives, civic leaders, elected officials and key staffers from every level of government including municipal, state and federal offices within these geographic segments are identified and briefings recommended. Additional stakeholders such as developers and other economic interests will also be provided detailed presentations. Elected officials identified include both those with portions of proposed alignments in their districts, and representatives with key committee or leadership assignments. Municipal and civic stakeholders are identified in their capacities as either key policy makers or leaders of active organizations or those organizations themselves, with a focus on business and economic development, transportation and land use advocacy. In all briefings, comments and concerns will be noted, analyzed and addressed.

Stakeholders identified include, at minimum, the following:

Elected Officials

- Federal Elected Officials
    - U.S. Senator Dianne Feinstein
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    - Congressman Gary Miller (Committee/Transportation & Infrastructure)
    - Congresswoman Diane Watson
    - Congressman Henry Waxman
- State of California
    - California State Senator Tom Torlakson (Chair, Transportation Committee)
    - California State Senator Kevin Murray
    - California State Senator Sheila Kuehl
    - Assemblywoman Jenny Oropeza (Chair, Transportation Committee)
    - Assemblywoman Karen Bass
    - Assemblyman Mark Ridley-Thomas

- Assemblywoman Fran Pavley

- Los Angeles County Supervisors
  - Zev Yaroslavsky
  - Yvonne B. Burke
- City of Los Angeles
  - Office of Mayor Antonio Villaraigosa
- Los Angeles City Councilmembers
  - Bernard Parks (MTA & City Transportation Committee)
  - Jack Weiss
  - Bill Rosendahl
  - Council District 10 (vacant)
  - Wendy Greuel (Chair, Transportation Committee)
  - Greig Smith (Member, Transportation Committee)
- Other Government
  - Westside Cities COG
  - South Bay Council of Government

Business/Transportation Advocacy Groups

- Los Angeles Area
  - Los Angeles Area Chamber of Commerce
  - Westside Urban Forum
  - Transit Coalition
- Other Business Stakeholders
  - Housing Developers

Interagency Coordination

- Los Angeles County Metropolitan Transportation Authority (Metro)
- Los Angeles Department of Transportation (LADOT)

- City of Culver City
- City of Santa Monica
- Los Angeles City Planning
- Los Angeles World Airports (LAWA)
- Amtrak
- Metrolink
- Caltrans Districts 7
- Federal Transit Administration (FTA)
- Federal Railroad Administration (FRA)

Institutions

- Union Station
- ProLogis (parent company of Catellus, Union Station property owner)
- University of California, Los Angeles (UCLA)
- Veteran's Administration
- GSA

Where segments of the study overlap, one tailored presentation will be made to that stakeholder, rather than multiple meetings.

Stakeholder Meetings

Meetings for Maglev Phase 2, Part III will focus on stakeholders at potential station sites in the Part III, Union Station to West Los Angeles segment. Thus, it will be especially important to brief those stakeholders representing the City of Los Angeles (Downtown and Westside areas), though stakeholders representing jurisdictions along that alignment have also been identified.

Meeting with these key stakeholders will take place at key project milestones, respectively at the project kicks-off (September 2005), as the locations of the potential stations are identified (February/March 2006) and then as the project recommendations are finalized (June 2006). The team will prepare PowerPoint presentations tailored to each geographic segment, although common themes will also be addressed.

Station Siting Workshop

Station Siting Workshops are proposed for the Maglev Phase 2, Part III segment and will involve agencies representing the City of Los Angeles, focusing on the Downtown and Westside areas. This workshop will aid the project team in refining its decision-making related to station siting prior to the second round of stakeholder briefings in February/March 2006.

Collateral Material Development

As noted, a PowerPoint presentation will be developed for each round of briefings which will also be used as a "leave behind" after each meeting. In addition, at least three fact sheets will be developed and distributed around the three major critical milestones, and copies of the PowerPoint presentations were provided as "leave behind" materials at all briefings.

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Summary of Comments

Comments collected during the course of Maglev Phase 2 Part III will be summarized and prepared in the narrative and categorized. These comments should reflect the general sentiment of key stakeholders and provide a broader context for the project recommendations. Comments and questions will be answered jointly by the consultant and SCAG's Project Manager.

MEMO ITEM 5.2

To: **Maglev Task Force Members**

From: **Zahi Faranesh (x819) and Pria Hidisyan (x953)**

Date: **November 10, 2005**

RE: **Cost Estimation Methodology**

RECOMMENDATION:

Review and approve the attached Cost Estimation Methodology presented by the IBI Group as part of the Phase 2 (Preliminary Engineering) Refined Cost Estimation effort.

SUMMARY:

Staff reviewed and provided feedback to the Cost Estimation Methodology. The plan was found to be consistent with the Refined Cost Estimation component of the Scope of Work identified for Phase 2, specifically Milestone 4 of Part 1, and Milestone 3 of Parts 2 and 3. The cost estimation is also consistent with Federal Railroad Administration requirements.

The document discusses the methods and assumptions that are used in developing capital cost estimates, including:

1. Structures/Foundations/Tunnels
2. Earthwork
3. Stations
4. Operation and Maintenance Facilities
5. Guideway/Communications/Signal/Power
6. Sound Walls (Noise Protection)
7. Safety Fencing/Landscape
8. Maglev Vehicles
9. ROW/Roadway Improvements/Utility Relocation/Traffic Control
10. Contingencies, Project Implementation, and Environmental Mitigation

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
MAGLEV DEPLOYMENT PROGRAM

PART 1 - MILESTONE 4
PART 2 - MILESTONE 3
PART 3 - MILESTONE 3

REFINED COST ESTIMATES

September 2005

Lockheed Martin- Integrated Systems and Solutions
2050 S. Blosser Road
Santa Maria, CA 93458

IBI Group
18401 Von Karman Avenue, Suite 110
Irvine, CA 92612

MAGLEV
TURNING THE VISION INTO REALITY

Table of Contents

2.0 Executive Summary

This document presents the three Refined Cost Estimates reports completed as part of the Maglev Deployment Program: Phase 2 Refined Cost Estimates effort. These reports address each of the three project parts, from West Los Angeles to Ontario International Airport, approximately 54 miles in length. The project parts are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley (19 to 21 miles depending on alignment), with two stations: one in Ontario Airport and the other in West Covina or the City of Industry. There are three different alignments being studied within Part 1.
- Part II: San Gabriel Valley to Union Station (18 to 20 miles depending on alignment), with a station in Los Angels Union Station. There are three different alignments being studied within Part 2.
- Part III: Union Station to West Los Angeles (17 miles), with a station in West Los Angeles. There is one alignment being studied within Part 3.

The subsequent three reports are identified as deliverables under the following project Milestones:

- Part I: Ontario International Airport to San Gabriel Valley – Milestone 4
- Part II: San Gabriel Valley to Union Station – Milestone 3
- Part III: Union Station to West Los Angeles – Milestone 3

Each report discusses the methods and assumptions that are used in developing capital cost estimates. The key elements considered in the cost estimates include:

- Structures/Foundations/Tunnels
- Earthwork
- Stations
- Operation and Maintenance Facilities
- Guideway/Communications/Signal/Power
- Sound Walls (Noise Protection)
- Safety Fencing/Landscape
- Maglev Vehicles
- ROW/Roadway Improvements/Utility Relocation/Traffic Control
- Contingencies, Project Implementation, and Environmental Mitigation

Examples of the capital cost and quantities estimate spreadsheets that will be used to develop the refined cost estimates are located at the end of each report. These will be completed during the Preliminary Engineering Task associated with this project.

2.4.1 Refined Cost Estimates – Part 1

Overview

This Milestone Report, Refined Cost Estimates for the Maglev Deployment Program: Phase 2 Part I, is the first of three focused documents that address the methodology for completing a refined cost estimating for the three segments of the IOS. This report will address Part I, Ontario International Airport (ONT) to the middle of San Gabriel Valley. Part I is approximately 19 to 21 miles in length depending on the alignment and contains 2 stations (depending on the alignment option, a station could be located in West Covina or the City of Industry). The remaining parts are as follows:

- Part II: San Gabriel Valley to Union Station
- Part III: Union Station to West Los Angeles

Cost estimates will be developed based on the following steps:

- Plans and profiles will be developed for each alignment alternative. Areas with grades over 3.5% will be evaluated to determine a feasible (lower grade) profile, generally resulting in a shift from aerial or fill sections to cut sections or tunnels.
- Quantity sheets from the plans and profiles will be prepared as an input to capital cost estimating.
- Travel times were estimated during Phase 1 of the program from demand modeling. Results from modeling helped to determine the size of the vehicle fleet and stations, and were fed into calculation of operating characteristics for the operating and maintenance cost estimates.

The following sections discuss the methods and assumptions that are used in developing capital cost estimates, including associated contingency, project implementation, and environmental impacts. In general, each Maglev technology subsystem includes the design, manufacture, factory commissioning, transport to the site, installation, and commissioning of the subsystem itself. The planning, engineering, project management, overall commissioning, training, and testing required to develop the entire system are defined as program implementation costs. The following sections contain an overview of the elements included in the cost estimates of the various subsystems.

Structures/Foundations/Tunnels

The system infrastructure consists of guideway structure, foundations/caissons, support columns, special civil structures (bridges, viaducts), and tunnels. The guideway structure costs are estimated for a double-track guideway. The structure cost per route mile for double track depends on column height and construction complexity. Five generic categories were used to account for this:

- Viaduct for Type 1 Guideway (Double Track elevated not more than 30 feet)

- High Viaduct for Type 1 Guideway (Double Track elevated greater than 30 feet)
- Bridge Structure with Type 3 Guideway (Double Track)
- Elevated Walkways
- Tunnel with Type 3 Guideway (Double Track)

Tunnel structure work includes boring/drilling/digging costs, ventilation systems, and tunnel electrical systems (lighting, fans, et cetera).

Earthwork

This category includes the excavation and grading of earth in cuts (removal of earth) and fills (addition of earth). Drainage structures, including culverts and under drains, will be estimated at 5% of the gross earthwork costs.

Stations/Maintenance Facilities

Stations

Components of each station include platforms, circulation, lighting, security measures, and auxiliary spaces. Spaces are provided for ticket sales, passenger information, station administration, baggage handling, and commercial space. The station cost estimates include the station building, station interior/equipment with HVAC, platform doors (automatic doors for passenger boarding/debarking and manual doors for emergency use), site development access roads, landscaping and preparation of site, and control and safety equipment.

The size of the station depends on the number of passengers using each station. Each station will have two 1,200-foot long platforms.

Lump sum costs are assumed for the stations. Part I of the alignment includes two potential stations:

- Ontario International Airport
- West Covina or City of Industry

Station costs do not include extensive parking facilities. These are assumed to be constructed by others.

Operation and Maintenance Facilities

The operation and maintenance facilities consist of the facilities and equipment required for the operation and maintenance of the Maglev system (operation control center, maintenance facilities, and maintenance vehicles). The major components assumed for Part I are as follows:

- Operations Control Center (OCC)
- Maintenance Facility

The Operations Control Center (OCC) is assumed to be part of the central maintenance facility.

The Central Maintenance Facility (assumed to be near Ontario Airport) would house the vehicle maintenance equipment and personnel required for major periodic, scheduled vehicle maintenance and for repair of exterior or interior damage. It will also be a home base for route maintenance personnel and equipment (guideway, propulsion, etc.). It will include multiple bays for vehicle repair and maintenance work, storage space for spare parts, and areas for offices/administration/personnel. Individual bays will be provided for vehicle integration, major periodic maintenance, and vehicle washing.

Guideway/Communications/Signal/Power

Guideway

The guideway infrastructure consists of the following major elements: guideway beams, guideway switches, guideway equipment, power substations, electric propulsion system, wayside equipment, energy supply, substations operating facilities, and operation control system. The guideway costs are estimated for a double-track guideway, based on an average for steel guideway superstructures, assuming the Transrapid design for guideway beams, (Type I and II beams), and for concrete elements (Type III on bridges). It is assumed that for the first construction phase only Type I and Type III guideway types will be utilized.

- Type I Guideway (Double Track)
- Type III Guideway (Double Track)

Power Substations/Distribution (Double Track)

The power (propulsion) system cost estimates include substations (building and equipment), wayside equipment, and the energy supply and distribution equipment for the substations. The number of substations and their size is based on the determined operating schedule, train fleet size, route layout (double-single- track), and route performance and characteristics (trip time, grades and curves, etc.).

The wayside equipment is the propulsion equipment along the route. These wayside elements include guideway switches, switch stations, power rails, and radio antennas. The trackside equipment (transformer stations, etc.) and supply cabling (located in the same trench/way as the propulsion feeder cables) are required to safely and reliably provide power to the wayside components along the route.

The energy supply equipment provides power to the substations at the 23 kV level and distributes power to all wayside elements of the system. The energy supply equipment includes the following elements: substations operating facilities, track, and stations. The substation operating facilities safely and reliably provide electrical power to the operation control center (including a non-interruptible supply).

Electric/Signals/Communications (Double Track)

The Communications equipment consists of maintenance facilities, emergency system, closed circuit television, public information and address systems, and other monitoring and detection devices needed for safe and efficient operation. Site preparation, foundations, cable trenches, electrical equipment, and all other costs of substation construction will be included in the cost estimates.

The Operations Control Technology (OCT) is the safety-related portion of the operation control system. The operation control technology includes: operation control/safety technology, stationary data transmission, radio data transmission, and vehicle location components (guideway mounted digital flags). The following operation control technology equipment is included in the Maglev vehicle control system: vehicle operation control system, mobile radio transmission equipment, and vehicle location system.

Sound Walls (Noise Protection)

Sound Walls along the outside of the guideway are intended to reduce noise from passing train sets. An allowance for sound walls will be made along the entire alignment.

Safety Fencing/Landscape

Safety Fencing and Landscaping is assumed along the full length of the alignment.

Vehicles Total Cost

At the first phase of the system, each Maglev train consists of six (6) cars coupled semi-permanently. The two types of cars (sections) are end sections and intermediate sections. The end sections are aerodynamically styled to be the leading (or trailing) end of the train and contain certain on-board control systems. Some end sections might be configured to accommodate airline luggage and other cargo in uniform containers, probably uniform loading devices (ULDs). The intermediate sections contain seating and related passenger amenities. Each section includes the following major subassemblies: car body, interior furnishings, vehicle on-board operation control system (end sections only), diagnostics, vehicle location system (end sections only), HVAC, and magnetic suspension (undercarriage).

The number of vehicles was estimated based on the round-trip time for each alternative, the 10-minute service headway, the capacity of the standard six-car train set, and the peak passenger load for each alternative, to determine whether multiple train sets would have to be couple to provide sufficient capacity. Spares are included in the estimated number of vehicles.

ROW/Roadway Improvements/Utility Relocation/Traffic Control

Right of Way

This includes costs associated with the purchase of land or easement rights, including relocation assistance, demolition costs, acquisition services, and the cost of purchase.

Right-of-way will be estimated using four generic categories for the type of adjacent development:

- Dense urban;
- Dense suburban;
- Suburban; and
- Rural

An allowance for the alignment envelope has been included for the full length of each alternative, based on the three types of right-of-way. In some places, the system would be aerial above public rights-of-way, and the costs of aerial easements would be minimal. In other areas where private land would need to be purchased or an aerial easement secured, the cost may be higher than the assumed average.

Roadway Improvements

The proposed Maglev alignment will be located along existing freeways and will cross over numerous local arterials. At several locations it is anticipated that existing roadways will have to be modified to facilitate the installation of the Maglev guideway structure. An allowance for reconstructing or realigning existing roadways and constructing retaining walls in order to conserve right-of-way will be included in the capital cost estimate prepared for this project.

Utility Relocation

Major utility relocations include overhead power lines, and underground facilities such as pipelines, water and sewer mains, and underground duct banks and vaults.

Costs for utility relocation are estimated using the land use categories from the right-of-way estimates. More densely built-up areas would be expected to have more utility conflicts with a new transportation system. The following land uses are expected along the alignment:

- Dense Urban Areas;
- Dense Suburban Areas;
- Suburban Areas; and
- Rural Areas.

Traffic Control During Construction

Two basic principles guide the implementation of a highway work zone: public safety and minimum interference to traffic. And although there would be a tremendous effort to minimize the impacts of construction on traffic, a project of this magnitude would require comprehensive traffic control plans (TCPs) for the construction period. All traffic control devices will conform to the latest edition of CALTRANS Traffic Manual of Traffic Control Devices for Construction and Maintenance Work Zones and the Standard Specifications for Public Works Construction.

Cost for preparation and implementation of traffic control plans for this project are estimated at three percent (3%) of actual construction cost of the structures and guideways.

Contingencies, Project Implementation, and Environmental Mitigation

The project implementation costs are typically computed as a percentage of the total construction and procurement costs, excluding vehicle costs, which are applied separately. The implementation costs assumed for the IOS are the following:

Construction Implementation

- 25% Design/Construction Contingency
- 30% Program Implementation
- 3% Environmental Mitigation

Vehicle Implementation

- 10% Cost Contingency
- 5% Procurement and Management

Costs are estimated for complete alternatives and not on a segmental basis. The percentages are based on other completed programs and widely accepted industry standards. The following is a discussion on the components of the implementation costs and the industry standard percentages typically used for estimation.

It should be noted that the implementation costs and contingencies are added as a percentage of certain cost categories based on past experience for projects in the early stages of definition. Contingencies are not to be considered as potential savings. Rather, they are an allowance added to the basic estimate to account for items and conditions that cannot be assessed at the time the estimate is prepared. The contingency amounts are expected to be needed as the project matures.

Design and Construction Contingency (25%)

A design contingency is included in the estimate for each alternative to account for unforeseen items or quantity fluctuations and variances in unit costs. The design contingency reflects the degree of risk associated with the level of engineering data available and design completion achieved for the various design elements. A construction contingency is also included in the estimate to cover the cost of changes in the scope or changed conditions that occur during construction. Typically at a 35% level of engineering and environmental analysis, the combined design and construction contingency is 25 percent and is applied uniformly to all facility and systems costs excluding vehicles.

Program Implementation (30%)

Program Implementation Contingency covers eight project cost items. The following is a detailed discussion for each.

Program and Design Management (5%)

This category reflects the overall management and administration of the project. Included are the program manager's office, contract management and administration, project control including both cost and schedule, general administration, computer support, quality assurance, system safety, publications, public relations, support of the bidding process, agency liaison, community information and involvement, and legal support.

Preliminary Engineering and Environmental Review (3%)

This cost reflects preliminary engineering design to approximately 35% level. This will include geotechnical investigations, land surveying and mapping, engineering architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the draft environmental document. The environmental review would entail all studies and analyses necessary to complete both federal and state required environmental documents.

Final Design (7%)

Final design and preparation of construction contingency prepares procurement documents for all facilities and systems. This will include additional geotechnical investigations, land surveying and mapping, engineering, architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the final design process. Design support during construction, including shop drawing review is also included in this item.

Construction and Procurement Management (5%)

This cost reflects all management of construction and procurement work after contracts are awarded to contractors or suppliers. This will include on-site inspection in both factory and field, quality control, contract administration and acceptance inspection.

Agency Costs (2%)

Agency costs represent the cost of maintaining the owner's organization during the entire program.

Forced Account Costs (1%)

Forced account costs represent the services of other organizations or agencies at the state, local or federal government level that may be required to support the project.

Risk Management (5%)

This contingency reflects the owner supplied insurance or any other allowances decided to be applied for the management of risk to the owner.

Testing and Pre-Revenue Operations (2%)

The costs of the pre-revenue testing, acceptance testing, safety certification and training related to start-up of the system for revenue service.

Environmental Impact Mitigation (3%)

Environmental impact mitigation can include a variety of costs such as traffic impact, noise and visual impact mitigation, wetlands replacement, landscaping, and aesthetic treatments. Based on recent experience with similar capital improvements in Southern California, these costs are assumed to be approximately 3% of the construction costs prior to adding contingencies and other add-on costs.

Vehicle Cost Contingency (10%)

This cost contingency is used to account for quantity fluctuations or design variances in vehicle orders. The industry standard for vehicle cost contingency is 10%, however this reflects the use of traditional rail technologies. Maglev vehicle costs have not been established and the 10% rule-of-thumb may or may not be applicable.

Vehicle Procurement and Management (5%)

The vehicle procurement and management category reflects costs associated with ordering the vehicle fleets and are typically computed as a percentage of the vehicle costs. As with the vehicle cost contingency, there is not currently a history for the maglev technology. The 5% rule-of-thumb may or may not be applicable.

CAPITAL COST AND QUANTITIES ESTIMATES

The spreadsheets that will be used to calculate the capital cost and quantities associated with the Maglev Project Part 1 are included for the three possible alignments which are currently being studied:

- UPRR/I-10 Alignment from Ontario International Airport to West Covina
- UPRR Alignment from Ontario International Airport to the City of Industry
- UPRR/SR-57/SR-60 Alignment from Ontario International Airport to the City of Industry

The accompanying spreadsheets will be filled in during the Preliminary Engineering task that is being performed as part of the Phase 2 scope of work.

Maglev Phase 2 - Part 1
Ontario International Airport to West Covina
UPRR/I-10 Alignment (19 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	19									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 1 - Ontario International Airport to West Covina - UPRR/I-10 Aligment

Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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Maglev Phase 2 - Part 1
Ontario International Airport to City of Industry
UPRR Alignment (20 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	20									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 1 - Ontario International Airport to City of Industry - UPRR Aligment

Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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Maglev Phase 2 - Part 1
Ontario International Airport to City of Industry
UPRR/SR-57/SR-60 Alignment (21 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	21									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 1 - Ontario International Airport to City of Industry - UPRR/SR-57/SR-60 Aligment																		
Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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2.3.2 Refined Cost Estimates – Part 2

Overview

This Milestone Report, Refined Cost Estimates for the Maglev Deployment Program: Phase 2 Part II, is the second of three focused documents that address the methodology for completing a refined cost estimating for the three segments of the IOS. This report will address Part II, from the middle of the San Gabriel Valley to Union Station in downtown Los Angeles. Part II is approximately 18 to 20 miles in length depending on the alignment with one station (at Union Station). The remaining segments are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley
- Part III: Union Station to West Los Angeles

Cost estimates will be developed based on the following steps:

- Plans and profiles will be developed for each alignment alternative. Areas with grades over 3.5% will be evaluated to determine a feasible (lower grade) profile, generally resulting in a shift from aerial or fill sections to cut sections or tunnels.
- Quantity sheets from the plans and profiles will be prepared as an input to capital cost estimating.
- Travel times were estimated during Phase 1 of the program from demand modeling. Results from modeling helped to determine the size of the vehicle fleet and stations, and were fed into calculation of operating characteristics for the operating and maintenance cost estimates.

The following sections discuss the methods and assumptions that are used in developing capital cost estimates, including associated contingency, project implementation, and environmental impacts. In general, each Maglev technology subsystem includes the design, manufacture, factory commissioning, transport to the site, installation, and commissioning of the subsystem itself. The planning, engineering, project management, overall commissioning, training, and testing required to develop the entire system are defined as program implementation costs. The following sections contain an overview of the elements included in the cost estimates of the various subsystems.

Structures/Foundations/Tunnels

The system infrastructure consists of guideway structure, foundations/caissons, support columns, special civil structures (bridges, viaducts), and tunnels. The guideway structure costs are estimated for a double-track guideway. The structure cost per route mile for double track depends on column height and construction complexity. Five generic categories were used to account for this:

- Viaduct for Type 1 Guideway (Double Track elevated not more than 30 feet)

- High Viaduct for Type 1 Guideway (Double Track elevated greater than 30 feet)
- Bridge Structure with Type 3 Guideway (Double Track)
- Elevated Walkways
- Tunnel with Type 3 Guideway (Double Track)

Tunnel structure work includes boring/drilling/digging costs, ventilation systems, and tunnel electrical systems (lighting, fans, et cetera). Tunneling is not expected in Part II of the alignment.

Earthwork

This category includes the excavation and grading of earth in cuts (removal of earth) and fills (addition of earth). Drainage structures, including culverts and under drains, will be estimated at 5% of the gross earthwork costs. In Part II of the alignment it is anticipated that earthwork (cut, fill, and tunneling) would be minimal and almost non existent, as most of the alignment is expected to be elevated.

Stations/Maintenance Facilities

Stations

Components of each station include platforms, circulation, lighting, security measures, and auxiliary spaces. Spaces are provided for ticket sales, passenger information, station administration, baggage handling, and commercial space. The station cost estimates include the station building, station interior/equipment with HVAC, platform doors (automatic doors for passenger boarding/debarking and manual doors for emergency use), site development access roads, landscaping and preparation of site, and control and safety equipment.

The size of the station depends on the number of passengers using each station. Each station will have two 1,200-foot long platforms.

Lump sum costs are assumed for the stations. Part II of the alignment includes only one station:

- Los Angeles Union Station

Station costs do not include extensive parking facilities. These are assumed to be constructed by others.

Operation and Maintenance Facilities

Although it is anticipated that the Central Maintenance Facility and Operations Control Center will be located in the Ontario Airport area, an alternative location for a maintenance facility along the Part II alignment segments is explored. The operation and maintenance facilities consist of the facilities and equipment required for the operation and maintenance of the Maglev system (operation control center, maintenance facilities, and maintenance vehicles). The major components assumed for Part II are as follows:

- Operations Control Center (OCC)
- Maintenance Facility

The Operations Control Center (OCC) is assumed to be part of the central maintenance facility.

The Central Maintenance Facility would house the vehicle maintenance equipment and personnel required for major periodic, scheduled vehicle maintenance and for repair of exterior or interior damage. It will also be a home base for route maintenance personnel and equipment (guideway, propulsion, etc.). It will include multiple bays for vehicle repair and maintenance work, storage space for spare parts, and areas for offices/administration/personnel. Individual bays will be provided for vehicle integration, major periodic maintenance, and vehicle washing.

Guideway/Communications/Signal/Power

Guideway

The guideway infrastructure consists of the following major elements: guideway beams, guideway switches, guideway equipment, power substations, electric propulsion system, wayside equipment, energy supply, substations operating facilities, and operation control system. The guideway costs are estimated for a double-track guideway, based on an average for steel guideway superstructures, assuming the Transrapid design for guideway beams, (Type I and II beams), and for concrete elements (Type III on bridges). It is assumed that for the first construction phase only Type I and Type III guideway types will be utilized.

- Type I Guideway (Double Track)
- Type III Guideway (Double Track)

Power Substations/Distribution (Double Track)

The power (propulsion) system cost estimates include substations (building and equipment), wayside equipment, and the energy supply and distribution equipment for the substations. The number of substations and their size is based on the determined operating schedule, train fleet size, route layout (double-single- track), and route performance and characteristics (trip time, grades and curves, etc.).

The wayside equipment is the propulsion equipment along the route. These wayside elements include guideway switches, switch stations, power rails, and radio antennas. The trackside equipment (transformer stations, etc.) and supply cabling (located in the same trench/way as the propulsion feeder cables) are required to safely and reliably provide power to the wayside components along the route.

The energy supply equipment provides power to the substations at the 23 kV level and distributes power to all wayside elements of the system. The energy supply equipment includes the following elements: substations operating facilities, track, and stations. The substation operating facilities safely and reliably provide electrical power to the operation control center (including a non-interruptible supply).

Electric/Signals/Communications (Double Track)

The Communications equipment consists of maintenance facilities, emergency system, closed circuit television, public information and address systems, and other monitoring and detection devices needed for safe and efficient operation. Site preparation, foundations, cable trenches, electrical equipment, and all other costs of substation construction will be included in the cost estimates.

The Operations Control Technology (OCT) is the safety-related portion of the operation control system. The operation control technology includes: operation control/safety technology, stationary data transmission, radio data transmission, and vehicle location components (guideway mounted digital flags). The following operation control technology equipment is included in the Maglev vehicle control system: vehicle operation control system, mobile radio transmission equipment, and vehicle location system.

Sound Walls (Noise Protection)

Sound Walls along the outside of the guideway are intended to reduce noise from passing train sets. An allowance for sound walls will be made along the entire alignment.

Safety Fencing/Landscape

Safety Fencing and Landscaping is assumed along the full length of the alignment.

Vehicles Total Cost

At the first phase of the system, each Maglev train consists of six (6) cars coupled semi-permanently. The two types of cars (sections) are end sections and intermediate sections. The end sections are aerodynamically styled to be the leading (or trailing) end of the train and contain certain on-board control systems. Some end sections might be configured to accommodate airline luggage and other cargo in uniform containers, probably uniform loading devices (ULDs). The intermediate sections contain seating and related passenger amenities. Each section includes the following major subassemblies: car body, interior furnishings, vehicle on-board operation control system (end sections only), diagnostics, vehicle location system (end sections only), HVAC, and magnetic suspension (undercarriage).

The number of vehicles was estimated based on the round-trip time for each alternative, the 10-minute service headway, the capacity of the standard six-car train set, and the peak passenger load for each alternative, to determine whether multiple train sets would have to be couple to provide sufficient capacity. Spares are included in the estimated number of vehicles.

ROW/Roadway Improvements/Utility Relocation/Traffic Control

Right of Way

This includes costs associated with the purchase of land or easement rights, including relocation assistance, demolition costs, acquisition services, and the cost of purchase.

Right-of-way will be estimated using four generic categories for the type of adjacent development:

- Dense urban;
- Dense suburban;
- Suburban; and
- Rural

An allowance for the alignment envelope has been included for the full length of each alternative, based on the three types of right-of-way. In some places, the system would be aerial above public rights-of-way, and the costs of aerial easements would be minimal. In other areas where private land would need to be purchased or an aerial easement secured, the cost may be higher than the assumed average.

Roadway Improvements

The proposed Maglev alignment will be located along existing freeways and will cross over numerous local arterials. At several locations it is anticipated that existing roadways will have to be modified to facilitate the installation of the Maglev guideway structure. An allowance for reconstructing or realigning existing roadways and constructing retaining walls in order to conserve right-of-way will be included in the capital cost estimate prepared for this project.

Utility Relocation

Major utility relocations include overhead power lines, and underground facilities such as pipelines, water and sewer mains, and underground duct banks and vaults.

Costs for utility relocation are estimated using the land use categories from the right-of-way estimates. More densely built-up areas would be expected to have more utility conflicts with a new transportation system. The following land uses are expected along the alignment:

- Dense Urban Areas;
- Dense Suburban Areas;
- Suburban Areas; and
- Rural Areas

Traffic Control During Construction

Two basic principles guide the implementation of a highway work zone: public safety and minimum interference to traffic. And although there would be a tremendous effort to minimize the impacts of construction on traffic, a project of this magnitude would require comprehensive traffic control plans (TCPs) for the construction period. All traffic control devices will conform to the latest edition of CALTRANS Traffic Manual of Traffic Control Devices for Construction and Maintenance Work Zones and the Standard Specifications for Public Works Construction.

Cost for preparation and implementation of traffic control plans for this project are estimated at three percent (3%) of actual construction cost of the structures and guideways.

Contingencies, Project Implementation, and Environmental Mitigation

The project implementation costs are typically computed as a percentage of the total construction and procurement costs, excluding vehicle costs, which are applied separately. The implementation costs assumed for the IOS are the following:

Construction Implementation

- 25% Design/Construction Contingency
- 30% Program Implementation
- 3% Environmental Mitigation

Vehicle Implementation

- 10% Cost Contingency
- 5% Procurement and Management

Costs are estimated for complete alternatives and not on a segmental basis. The percentages are based on other completed programs and widely accepted industry standards. The following is a discussion on the components of the implementation costs and the industry standard percentages typically used for estimation.

It should be noted that the implementation costs and contingencies are added as a percentage of certain cost categories based on past experience for projects in the early stages of definition. Contingencies are not to be considered as potential savings. Rather, they are an allowance added to the basic estimate to account for items and conditions that cannot be assessed at the time the estimate is prepared. The contingency amounts are expected to be needed as the project matures.

Design and Construction Contingency (25%)

A design contingency is included in the estimate for each alternative to account for unforeseen items or quantity fluctuations and variances in unit costs. The design contingency reflects the degree of risk associated with the level of engineering data available and design completion achieved for the various design elements. A construction contingency is also included in the estimate to cover the cost of changes in the scope or changed conditions that occur during construction. Typically at a 35% level of engineering and environmental analysis, the combined design and construction contingency is 25 percent and is applied uniformly to all facility and systems costs excluding vehicles.

Program Implementation (30%)

Program Implementation Contingency covers eight project cost items. The following is a detailed discussion for each.

Program and Design Management (5%)

This category reflects the overall management and administration of the project. Included are the program manger's office, contract management and administration, project control including both cost and schedule, general administration, computer support, quality assurance, system safety, publications, public relations, support of the bidding process, agency liaison, community information and involvement, and legal support.

Preliminary Engineering and Environmental Review (3%)

This cost reflects preliminary engineering design to approximately 35% level. This will include geotechnical investigations, land surveying and mapping, engineering architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the draft environmental document. The environmental review would entail all studies and analyses necessary to complete both federal and state required environmental documents.

Final Design (7%)

Final design and preparation of construction contingency prepares procurement documents for all facilities and systems. This will include additional geotechnical investigations, land surveying and mapping, engineering, architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the final design process. Design support during construction, including shop drawing review is also included in this item.

Construction and Procurement Management (5%)

This cost reflects all management of construction and procurement work after contracts are awarded to contractors or suppliers. This will include on-site inspection in both factory and field, quality control, contract administration and acceptance inspection.

Agency Costs (2%)

Agency costs represent the cost of maintaining the owner's organization during the entire program.

Forced Account Costs (1%)

Forced account costs represent the services of other organizations or agencies at the state, local or federal government level that may be required to support the project.

Risk Management (5%)

This contingency reflects the owner supplied insurance or any other allowances decided to be applied for the management of risk to the owner.

Testing and Pre-Revenue Operations (2%)

The costs of the pre-revenue testing, acceptance testing, safety certification and training related to start-up of the system for revenue service.

Environmental Impact Mitigation (3%)

Environmental impact mitigation can include a variety of costs such as traffic impact, noise and visual impact mitigation, wetlands replacement, landscaping, and aesthetic treatments. Based on recent experience with similar capital improvements in Southern California, these costs are assumed to be approximately 3% of the construction costs prior to adding contingencies and other add-on costs.

Vehicle Cost Contingency (10%)

This cost contingency is used to account for quantity fluctuations or design variances in vehicle orders. The industry standard for vehicle cost contingency is 10%, however this reflects the use of traditional rail technologies. Maglev vehicle costs have not been established and the 10% rule-of-thumb may or may not be applicable.

Vehicle Procurement and Management (5%)

The vehicle procurement and management category reflects costs associated with ordering the vehicle fleets and are typically computed as a percentage of the vehicle costs. As with the vehicle cost contingency, there is not currently a history for the maglev technology. The 5% rule-of-thumb may or may not be applicable.

CAPITAL COST AND QUANTITIES ESTIMATES

The spreadsheets that will be used to calculate the capital cost and quantities associated with the Maglev Project Part 2 are included for the three possible alignments which are currently being studied:

- I-10/UPRR Alignment from West Covina to Union Station
- UPRR/I-10/UPPR Alignment from the City of Industry to Union Station
- SR-60/I-710/I-10/UPRR Alignment from the City of Industry to Union Station

The accompanying spreadsheets will be filled in during the Preliminary Engineering task that is being performed as part of the Phase 2 scope of work.

Maglev Phase 2 - Part 2
West Covina to Union Station
I-10/UPRR Alignment (18 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	18									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 2 - West Covina to Union Station - I-10/UPRR Aligment																		
Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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Maglev Phase 2 - Part 2
City of Industry to Union Station
UPRR/I-10/UPRR Alignment (19 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	19									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 2 - City of Industry to Union Station - UPRR/I-10/UPRR Aligment

Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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Maglev Phase 2 - Part 2
City of Industry to Union Station
SR-60/I-710/I-10/UPRR Alignment (20 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	20									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 2 - City of Industry to Union Station - SR-60/I-710/I-10/UPRR Aligment																		
Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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2.3.3 Refined Cost Estimates – Part 3

Overview

This Milestone Report, Refined Cost Estimates for the Maglev Deployment Program: Phase 2 Part III, is the third of three focused documents that address the methodology for completing a refined cost estimating for the three segments of the IOS. This report will address Part III: Union Station to West Los Angeles. Part III is approximately 17 miles with one station at West Los Angeles. The remaining segments are as follows:

- Part I: Ontario International Airport (ONT) to San Gabriel Valley
- Part II: San Gabriel Valley to Union Station

Cost estimates will be developed based on the following steps:

- Plans and profiles will be developed for each alignment alternative. Areas with grades over 3.5% will be evaluated to determine a feasible (lower grade) profile, generally resulting in a shift from aerial or fill sections to cut sections or tunnels.
- Quantity sheets from the plans and profiles will be prepared as an input to capital cost estimating.
- Travel times were estimated during Phase 1 of the program from demand modeling. Results from modeling helped to determine the size of the vehicle fleet and stations, and were fed into calculation of operating characteristics for the operating and maintenance cost estimates.

The following sections discuss the methods and assumptions that are used in developing capital cost estimates, including associated contingency, project implementation, and environmental impacts. In general, each Maglev technology subsystem includes the design, manufacture, factory commissioning, transport to the site, installation, and commissioning of the subsystem itself. The planning, engineering, project management, overall commissioning, training, and testing required to develop the entire system are defined as program implementation costs. The following sections contain an overview of the elements included in the cost estimates of the various subsystems.

Structures/Foundations/Tunnels

The system infrastructure consists of guideway structure, foundations/caissons, support columns, special civil structures (bridges, viaducts), and tunnels. The guideway structure costs are estimated for a double-track guideway. The structure cost per route mile for double track depends on column height and construction complexity. Five generic categories were used to account for this:

- Viaduct for Type 1 Guideway (Double Track elevated not more than 30 feet)
- High Viaduct for Type 1 Guideway (Double Track elevated greater than 30 feet)

- Bridge Structure with Type 3 Guideway (Double Track)
- Elevated Walkways
- Tunnel with Type 3 Guideway (Double Track)

Tunnel structure work includes boring/drilling/digging costs, ventilation systems, and tunnel electrical systems (lighting, fans, et cetera). Tunneling is not expected in Part III of the alignment.

Earthwork

This category includes the excavation and grading of earth in cuts (removal of earth) and fills (addition of earth). Drainage structures, including culverts and under drains, will be estimated at 5% of the gross earthwork costs. In Part III of the alignment it is anticipated that earthwork (cut, fill, and tunneling) would be minimal and almost non existent, as most of the alignment is expected to be elevated.

Stations/Maintenance Facilities

Stations

Components of each station include platforms, circulation, lighting, security measures, and auxiliary spaces. Spaces are provided for ticket sales, passenger information, station administration, baggage handling, and commercial space. The station cost estimates include the station building, station interior/equipment with HVAC, platform doors (automatic doors for passenger boarding/debarking and manual doors for emergency use), site development access roads, landscaping and preparation of site, and control and safety equipment.

The size of the station depends on the number of passengers using each station. Each station will have two 1,200-foot long platforms.

Lump sum costs are assumed for the stations. Part III of the alignment includes only one station:

- West Los Angeles

Station costs do not include extensive parking facilities. These are assumed to be constructed by others.

Operation and Maintenance Facilities

Although it is anticipated that the Central Maintenance Facility and Operations Control Center will be located in the Ontario Airport area, a secondary small maintenance facility is assumed near West Los Angeles. It would house vehicle maintenance equipment and personnel required for daily and unscheduled maintenance, and vehicle washing. Parking tracks for out-of-service vehicles would be located close to this facility. This facility would be housed in a freestanding building with one track for vehicle maintenance work, storage space for spare parts, and areas for personnel.

Guideway/Communications/Signal/Power

Guideway

The guideway infrastructure consists of the following major elements: guideway beams, guideway switches, guideway equipment, power substations, electric propulsion system, wayside equipment, energy supply, substations operating facilities, and operation control system. The guideway costs are estimated for a double-track guideway, based on an average for steel guideway superstructures, assuming the Transrapid design for guideway beams, (Type I and II beams), and for concrete elements (Type III on bridges). It is assumed that for the first construction phase only Type I and Type III guideway types will be utilized.

- Type I Guideway (Double Track)
- Type III Guideway (Double Track)

Power Substations/Distribution (Double Track)

The power (propulsion) system cost estimates include substations (building and equipment), wayside equipment, and the energy supply and distribution equipment for the substations. The number of substations and their size is based on the determined operating schedule, train fleet size, route layout (double-single- track), and route performance and characteristics (trip time, grades and curves, etc.).

The wayside equipment is the propulsion equipment along the route. These wayside elements include guideway switches, switch stations, power rails, and radio antennas. The trackside equipment (transformer stations, etc.) and supply cabling (located in the same trench/way as the propulsion feeder cables) are required to safely and reliably provide power to the wayside components along the route.

The energy supply equipment provides power to the substations at the 23 kV level and distributes power to all wayside elements of the system. The energy supply equipment includes the following elements: substations operating facilities, track, and stations. The substation operating facilities safely and reliably provide electrical power to the operation control center (including a non-interruptible supply).

Electric/Signals/Communications (Double Track)

The Communications equipment consists of maintenance facilities, emergency system, closed circuit television, public information and address systems, and other monitoring and detection devices needed for safe and efficient operation. Site preparation, foundations, cable trenches, electrical equipment, and all other costs of substation construction will be included in the cost estimates.

The Operations Control Technology (OCT) is the safety-related portion of the operation control system. The operation control technology includes: operation control/safety technology, stationary data transmission, radio data transmission, and vehicle location components (guideway mounted digital flags). The following operation control technology equipment is included in the Maglev vehicle control system: vehicle operation control system, mobile radio transmission equipment, and vehicle location system.

Sound Walls (Noise Protection)

Sound Walls along the outside of the guideway are intended to reduce noise from passing train sets. An allowance for sound walls will be made along the entire alignment.

Safety Fencing/Landscape

Safety Fencing and Landscaping is assumed along the full length of the alignment.

Vehicles Total Cost

At the first phase of the system, each Maglev train consists of six (6) cars coupled semi-permanently. The two types of cars (sections) are end sections and intermediate sections. The end sections are aerodynamically styled to be the leading (or trailing) end of the train and contain certain on-board control systems. Some end sections might be configured to accommodate airline luggage and other cargo in uniform containers, probably uniform loading devices (ULDs). The intermediate sections contain seating and related passenger amenities. Each section includes the following major subassemblies: car body, interior furnishings, vehicle on-board operation control system (end sections only), diagnostics, vehicle location system (end sections only), HVAC, and magnetic suspension (undercarriage).

The number of vehicles was estimated based on the round-trip time for each alternative, the 10-minute service headway, the capacity of the standard six-car train set, and the peak passenger load for each alternative, to determine whether multiple train sets would have to be couple to provide sufficient capacity. Spares are included in the estimated number of vehicles.

ROW/Roadway Improvements/Utility Relocation/Traffic Control

Right of Way

This includes costs associated with the purchase of land or easement rights, including relocation assistance, demolition costs, acquisition services, and the cost of purchase.

Right-of-way will be estimated using four generic categories for the type of adjacent development:

- Dense urban;
- Dense suburban;
- Suburban; and
- Rural

An allowance for the alignment envelope has been included for the full length of each alternative, based on the three types of right-of-way. In some places, the system would be aerial above public rights-of-way, and the costs of aerial easements would be minimal. In other areas where private land would need to be purchased or an aerial easement secured, the cost may be higher than the assumed average.

Roadway Improvements

The proposed Maglev alignment will be located along existing freeways and will cross over numerous local arterials. At several locations it is anticipated that existing roadways will have to be modified to facilitate the installation of the Maglev guideway structure. An allowance for reconstructing or realigning existing roadways and constructing retaining walls in order to conserve right-of-way will be included in the capital cost estimate prepared for this project.

Utility Relocation

Major utility relocations include overhead power lines, and underground facilities such as pipelines, water and sewer mains, and underground duct banks and vaults.

Costs for utility relocation are estimated using the land use categories from the right-of-way estimates. More densely built-up areas would be expected to have more utility conflicts with a new transportation system. The following land uses are expected along the alignment:

- Dense Urban Areas;
- Dense Suburban Areas;
- Suburban Areas; and
- Rural Areas.

Traffic Control During Construction

Two basic principles guide the implementation of a highway work zone: public safety and minimum interference to traffic. And although there would be a tremendous effort to minimize the impacts of construction on traffic, a project of this magnitude would require comprehensive traffic control plans (TCPs) for the construction period. All traffic control devices will conform to the latest edition of CALTRANS Traffic Manual of Traffic Control Devices for Construction and Maintenance Work Zones and the Standard Specifications for Public Works Construction.

Cost for preparation and implementation of traffic control plans for this project are estimated at three percent (3%) of actual construction cost of the structures and guideways.

Contingencies, Project Implementation, and Environmental Mitigation

The project implementation costs are typically computed as a percentage of the total construction and procurement costs, excluding vehicle costs, which are applied separately. The implementation costs assumed for the IOS are the following:

Construction Implementation

- 25% Design/Construction Contingency
- 30% Program Implementation
- 3% Environmental Mitigation

Vehicle Implementation

- 10% Cost Contingency
- 5% Procurement and Management

Costs are estimated for complete alternatives and not on a segmental basis. The percentages are based on other completed programs and widely accepted industry standards. The following is a discussion on the components of the implementation costs and the industry standard percentages typically used for estimation.

It should be noted that the implementation costs and contingencies are added as a percentage of certain cost categories based on past experience for projects in the early stages of definition. Contingencies are not to be considered as potential savings. Rather, they are an allowance added to the basic estimate to account for items and conditions that cannot be assessed at the time the estimate is prepared. The contingency amounts are expected to be needed as the project matures.

Design and Construction Contingency (25%)

A design contingency is included in the estimate for each alternative to account for unforeseen items or quantity fluctuations and variances in unit costs. The design contingency reflects the degree of risk associated with the level of engineering data available and design completion achieved for the various design elements. A construction contingency is also included in the estimate to cover the cost of changes in the scope or changed conditions that occur during construction. Typically at a 35% level of engineering and environmental analysis, the combined design and construction contingency is 25 percent and is applied uniformly to all facility and systems costs excluding vehicles.

Program Implementation (30%)

Program Implementation Contingency covers eight project cost items. The following is a detailed discussion for each.

Program and Design Management (5%)

This category reflects the overall management and administration of the project. Included are the program manger's office, contract management and administration, project control including both cost and schedule, general administration, computer support, quality assurance, system safety, publications, public relations, support of the bidding process, agency liaison, community information and involvement, and legal support.

Preliminary Engineering and Environmental Review (3%)

This cost reflects preliminary engineering design to approximately 35% level. This will include geotechnical investigations, land surveying and mapping, engineering architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the draft environmental document.

The environmental review would entail all studies and analyses necessary to complete both federal and state required environmental documents.

Final Design (7%)

Final design and preparation of construction contingency prepares procurement documents for all facilities and systems. This will include additional geotechnical investigations, land surveying and mapping, engineering, architecture, landscape architecture, traffic engineering, right-of-way engineering, preparation of preliminary plans and analyses in all necessary technical disciplines, and various other technical studies and support of the final design process. Design support during construction, including shop drawing review is also included in this item.

Construction and Procurement Management (5%)

This cost reflects all management of construction and procurement work after contracts are awarded to contractors or suppliers. This will include on-site inspection in both factory and field, quality control, contract administration and acceptance inspection.

Agency Costs (2%)

Agency costs represent the cost of maintaining the owner's organization during the entire program.

Forced Account Costs (1%)

Forced account costs represent the services of other organizations or agencies at the state, local or federal government level that may be required to support the project.

Risk Management (5%)

This contingency reflects the owner supplied insurance or any other allowances decided to be applied for the management of risk to the owner.

Testing and Pre-Revenue Operations (2%)

The costs of the pre-revenue testing, acceptance testing, safety certification and training related to start-up of the system for revenue service.

Environmental Impact Mitigation (3%)

Environmental impact mitigation can include a variety of costs such as traffic impact, noise and visual impact mitigation, wetlands replacement, landscaping, and aesthetic treatments. Based on recent experience with similar capital improvements in Southern California, these costs are assumed to be approximately 3% of the construction costs prior to adding contingencies and other add-on costs.

Vehicle Cost Contingency (10%)

This cost contingency is used to account for quantity fluctuations or design variances in vehicle orders. The industry standard for vehicle cost contingency is 10%, however

this reflects the use of traditional rail technologies. Maglev vehicle costs have not been established and the 10% rule-of-thumb may or may not be applicable.

Vehicle Procurement and Management (5%)

The vehicle procurement and management category reflects costs associated with ordering the vehicle fleets and are typically computed as a percentage of the vehicle costs. As with the vehicle cost contingency, there is not currently a history for the maglev technology. The 5% rule-of-thumb may or may not be applicable.

CAPITAL COST AND QUANTITIES ESTIMATES

The spreadsheets that will be used to calculate the capital cost and quantities associated with the Maglev Project Part 3 are included for the one alignment that is currently being studied between Union Station and West Los Angeles. The accompanying spreadsheets will be filled in during the Preliminary Engineering task that is being performed as part of the Phase 2 scope of work.

Maglev Phase 2 - Part 3
Union Station to West Los Angeles
UPRR/I-10/I-405 Alignment (17 miles)
Double Track (2 Stations)

Capital Cost Estimate

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6091									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	17									
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
High Viaduct for Type 1 Guideway (Double Track)	XX	Feet	-							
Bridge Structure with Type 3 Guideway (Double Track)	XX	Feet	-							
Elevated Walkways	XX	Feet	-							
Tunnel with Type 3 Guideway (Double Track)	XX	Feet	-							
						25.0%	30.0%	3.0%	58.0%	
Earthwork ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cut	XX	cu-yd	-							
Fill	XX	cu-yd	-							
Drainage	5% of cut/fill									
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Stations										
Ontario Airport Station	1	each	-		$ -					
West Covina Station	1	each	-							
Maintenance										
Maintenance Facilities	1	each	-		$ -					
Operation Control Center (OCC)	1	each	-							
Parking Facility ($XX per space)	-	each	-							
Small facility/switchyard	2	each	-							
						25.0%	30.0%	3.0%	58.0%	
Guideway/Communications/Signal/Power ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Type 1 Guideway (Double Track)	XX	Mile	-							
Type 3 Guideway (Double Track)	XX	Mile	-							
Power Substations/Distribution (Double Track)	XX	Mile	-							
Electric/Signals/Communications (Double Track)	XX	Mile	-							
Sound Walls (Noise Protection)	XX	Mile	-							
Safety Fencing/Landscape	XX	Mile	-							
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Six (6) car Consists	XX	each	-							
						25.0%	30.0%	3.0%	58.0%	
ROW/Roadway Improvements/Utility Relocation/Traffic Control==========					$ -	$ -	$ -	$ -	$ -	$ -
Right of Way					$ -					
Dense Urban Areas	XX	sq-ft	-							
Dense Suburban Areas	XX	sq-ft	-							
Suburban Areas	XX	sq-ft	-							
Rural Areas	XX	sq-ft	-							
Roadway Improvements					$ -					
Roadway Improvements	XX	sq-ft								
Retaining Walls	XX	sq-ft								
Utility Relocation					$ -					
In Dense Urban Areas	XX	Mile	-							
In Dense Suburban Areas	XX	Mile	-							
In Suburban Areas	XX	Mile	-							
In Rural Areas	XX	Mile	-							
Traffic Control During Construction (2.5% of structure+guideway)	XX	Mile	-		$ -					
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ -	$ -	$ -	$ -	$ -	$ -
Cost per Mile (Double Track System) ==========>					$ -	$ -	$ -	$ -	$ -	$ -

Quantities Estimate for Maglev Phase 2, Part 3 - Union Station to West Los Angeles - UPRR/I-10/I-405 Aligment																		
Plan & Profile Sheet No.	Stationing		Viaduct with Type 1 Guideway (ft)	High Viaduct with Type 1 Guideway (ft)	Bridge Structure with Type 3 Guideway (ft)	Length of Viaduct or Bridge with Straddle Bents (ft)	Cut		Fill		Tunnel	Required Right-of-Way				Roadway Improvements (sq-ft)	Retaining Walls (sq-ft)
	From	To					Length (ft)	Volume (cu-yd)	Length (ft)	Volume (cu-yd)	Length (ft)	Dense Urban (sq-ft)	Dense Sub-urban (sq-ft)	Suburban (sq-ft)	Rural (sq-ft)		
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MEMO ITEM 6.1

To: **Maglev Task Force Members**

From: **Al Perdon, Executive Director, Orange Line Joint Power Authority**

Date: **November 10, 2005**

RE: **Update on Maglev Orange Line**

SUMMARY:

Al Perdon will provide a status update on the Maglev Orange Line, including the work plan for the $280,000 earmark from SAFETEA-LU.

MEMO ITEM 6.2

To: **Maglev Task Force Members**

From: **Zahi Faranesh (x819) and Pria Hidisyan (x953)**

Date: **November 10, 2005**

RE: **Cambridge Systematics Alternatives Analysis update**

SUMMARY:

Work is underway for the Alternatives Analysis being conducted by Cambridge Systematics. Staff is working with the other Project Managers from the City of Ontario, City of Los Angeles and SANBAG to refine the Detailed Work Plan, per recommended changes by the Federal Railroad Administration.

BACKGROUND:

A notice to proceed was sent on August 4, 2005. The study will analyze State High Speed Rail and Maglev on the Initial Operating Segment from West Los Angeles to Ontario Airport. The consultant has drafted a Detailed Work Plan, which was commented upon by the Federal Railroad Administration.

MEMO ITEM 6.3

To: **Maglev Task Force Members**

From: **Zahi Faranesh (x819)**

Date: **November 10, 2005**

RE: **Shanghai Trip Update**

SUMMARY:

Staff will provide members with a status update on the planned trip to Shanghai and Nagoya for elected officials in the SCAG region to experience global Maglev technologies. Briefly, staff has explored many funding possibilities including private, non-profit and government sources. Legal staff is reviewing these possibilities and will be offering advice on the best option for funding. Due to delays in securing funding for the trip, the schedule is being pushed back to February or March 2006. The SCAG delegation will have the opportunity to join a delegation from the San Diego Association of Governments who will also be going to Shanghai and Nagoya. Further, the purposes of the trip may be expanded to include regional priorities such as goods movement, trade and other topics of interest to participants. Staff has been coordinating with the Chinese Chamber of Commerce, the City of Shanghai and Maglev officials in China.

BACKGROUND:

During the June 2005 Maglev Task Force meeting, members took action to send up to 15 elected officials to Shanghai, China and Nagoya, Japan in order to educate them on the potential of Maglev technology in the SCAG region. Further, if no other sources of funding could be secured, the Maglev Task Force advised the use of the General Fund for purposes of the trip. During the July 7, 2005 Administrative Committee meeting, staff briefed members on this action taken by the Maglev Task Force to organize a trip to Shanghai, China for a delegation of elected officials from SCAG. The Administrative Committee denied the use of the General Fund for this trip.